

Summary - 50-Hour Test Results

Item	50 Hour Tests Completed April 1962 (Preliminary Visual Inspection 4 May 1962)		50 Hour Tests Completed October 1961	
Engine Number	Engine FX-114	Engine XD-3	Engine FX-112	Engine FX-115
Test Conditions	Sea level afterburning mission endurance	Mach 2.3 non afterburning mission endurance	Sea level partial after- burning endurance	Mach 2.0 partial after- burning endurance
Time Breakdown (Hours)				
Total this build	71	79	70	136
Endurance cycle	60	60	50	57
Afterburning	40	0	49	80
Maximum Afterburning	23	0	0	0
Maximum 1900°F Turbine	42	40	0	0
Mach 1.5 inlet temperature	0	50	0	85
Mach 2.0 inlet temperature	0	48	0	50
Mach 2.3 inlet temperature	0	40	0	0
With automatic controls	71	79	0	0
Summary Inspection Findings:				
1. Compressor	Bolted rotor design. Condition good.	Bolted rotor design. Condition good.	Non bolted rotor design. Loose rim dampers; 9th stage seal broken.	Non bolted rotor design. Loose rim dampers; 6,7,8 stage seal lands cracked.
2. Main Fuel Nozzles	Some coking - generally good.	Some coking - generally good.	Slight coking - generally good.	Slight coking - generally good.
3. Diffuser Case and Main Burner Cans	Some coking - generally good.	Some coking - generally good.	Some coking - generally good.	Some coking - generally good.
4. Transition Duct - Hot Gas Path to Turbine	Good	Good	Heavily burner and burned through at one spot.	Good
5. Turbine Inlet Temperature Thermo-couple Housings	Good	Good	Many heavily burned and one burned through.	Good
6. Turbine Blades and Vanes	Good - even heat distribution.	Good - even heat distribution.	Heavy heat concentration at tips.	Good - even heat distribution.

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7. Afterburner	Liners broken out. Some spray-bar plugging.	Not tested.	Liner attachments broken.	Good
8. Plumbing	One bill of material pipe failure at 10 hours, replaced with redesign which ran OK for 40 hours.	Same bill of material pipe failed 3 times prior to fix established on FX-114.	Numerous failures.	Numerous failures.
9. Controls	Good - fully automatic without adjustment after start of test.	Good - fully automatic without adjustment after start of test	Not capable of automatic operation.	Not capable of automatic operation.
10. Chemical Ignition Unit	Good	Replaced due seal left out during assembly at Hamilton-Standard.	Leakage	Leakage
11. Hydraulic Pump	Replaced at 25 hours due leak at inlet. OK thereafter. Inspection incomplete. Used 3% oil additive.	Good - some internal wear but no performance deterioration. Used 3% oil additive.	Replaced due bore wear. No oil additive.	Replaced due failure 5 mounting bolts. 25% performance deterioration. No oil additive.
12. Engine Gearbox	Good except hydraulic pump drive pad coked.	Good except shaft cover bellows cracked.	Tower shaft bearing support cracked.	Good
13. Turbine Exhaust Case	One #3 bearing strut cracked due bad braze.	Good	Good	Good
14. Main Bearings	Good	Good	#3 bearing seal wear.	#3 bearing seal wear.

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